

***AMBLYOMMA PAULOPUNCTATUM* NEUMANN
(IXODOIDEA: IXODIDAE): REDESCRIPTION OF THE
MALE AND FEMALE, WITH AN ACCOUNT OF ITS
KNOWN HOSTS AND DISTRIBUTION**

JAMES E. KEIRANS

Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Allergy and Infectious Diseases, Department of Entomology, Museum Support Center, Smithsonian Institution, Washington, D.C. 20560.

Abstract.—The ♂ and ♀ of *Amblyomma paulopunctatum* Neumann are redescribed and illustrated. This porcine feeding tick species is found in forested areas of west and central Africa and is a candidate vector of *Coxiella burnetii*, the causative agent of Q fever.

Amblyomma paulopunctatum Neumann primarily parasitizes members of the mammalian family Suidae but has occasionally been recorded from lizards, elephants and humans in equatorial Africa from Guinea-Bissau and Guinea eastward to Uganda and Burundi. Little information has been published on this uncommon tick, and the reports of the causative agent of Q fever (Tendeiro, 1953; Theiler, 1962) in *A. paulopunctatum* point to the need to investigate the role of this species as a disease vector in porcine and human infections.

Amblyomma paulopunctatum was first described by Neumann (1899) from one male from an unknown host at Konakry, French Guinea, now Conakry, Guinea. Subsequently (Neumann, 1905), he had a change of mind and relegated *A. paulopunctatum* to a variety of *Amblyomma sparsum* Neumann, 1899. Three years later (Neumann, 1908) he described the female under the name *Amblyomma trimaculatum* from one specimen from an unknown host at Robertsport, Liberia. Nuttall (1916a, b) reproduced Neumann's figure of this female.

Following is a redescription of the male and female. All measurements are in millimeters. Fifteen males and 12 females were measured. A range is given followed by a mean in parentheses. Specimens were prepared for scanning electron microscopy by the method of Corwin et al. (1979).

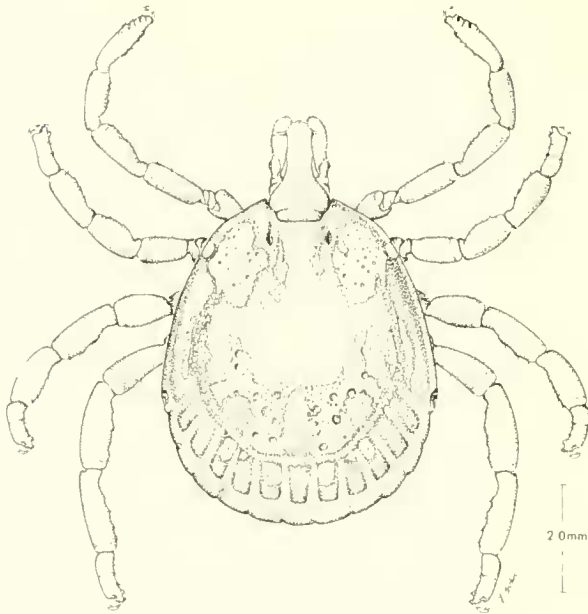
***Amblyomma paulopunctatum* Neumann**

Amblyomma paulopunctatum Neumann 1899: 248.

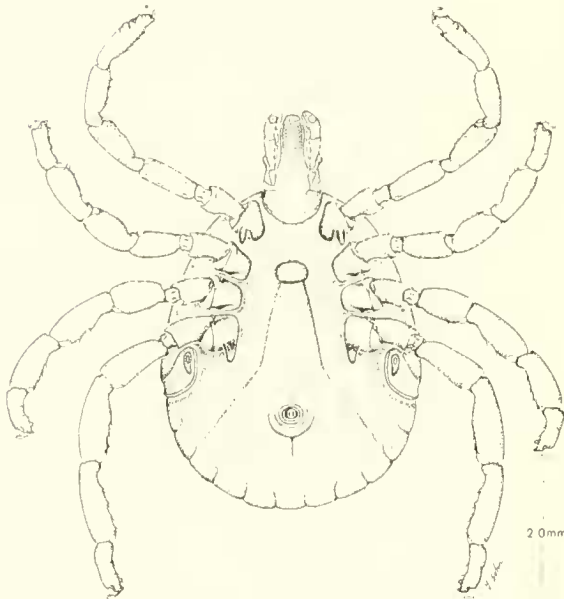
Amblyomma sparsum paulopunctatum Neumann 1905: 233.

Amblyomma trimaculatum Neumann 1908: 84, figs. 5-7.

Redescription.—Male (Figs. 1-6).—Length from scapular apices to posterior body margin 4.83-7.00 (5.74), width 4.10-5.85 (4.85), widest at level of spiracular plates, outline oval. Scutal length from scapular apices to anterior margin of



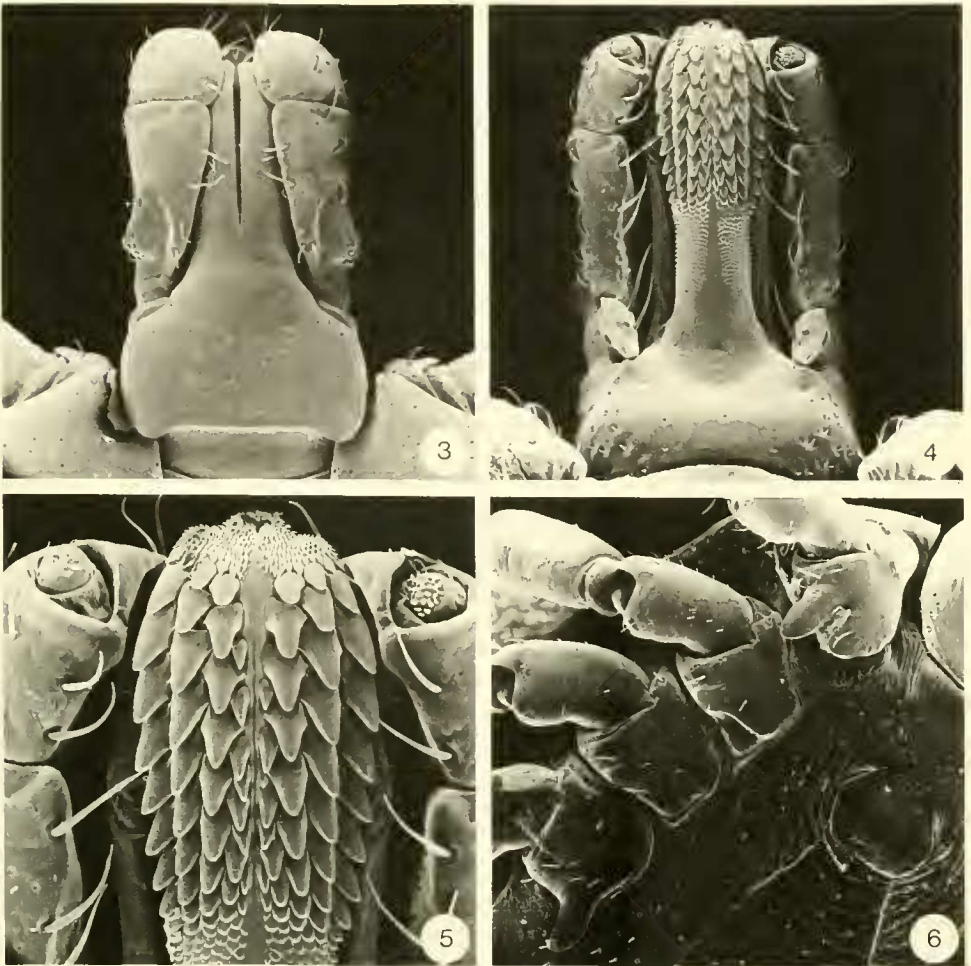
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Figs. 1, 2. *Amblyomma paulopunctatum* ♂ ZAIRE (RML 116826). 1, Dorsal view. 2, Ventral view.

festoons 3.95–5.70 (4.69), width between marginal grooves 3.18–4.50 (3.73). *Scutum* (Fig. 1) ornate, typically with a large pale spot near each eye and pale spots near festoon 1 and festoons 4–5, posteroaccessory stripes and posteromedian stripe indicated by interruptions of coloration between these spots; marginal spots rep-



Figs. 3-6. *Amblyomma paulopunctatum* ♂ ZAIRE (RML I16826). 3, Capitulum, dorsal view (50×). 4, Capitulum, ventral view (63×). 5, Hypostome (138×). 6, Coxae I-IV (50×).

resented by a continuous pale stripe anterior to festoon 1; lateral spots fused into a stripe and usually present medial to but less obvious than marginal spots. Ornamentation typically on festoons 3-6 (32 specimens) or 3-5 (30), occasionally on 2-6 (5) and on one specimen each 2-5 and 3, 5. *Marginal groove* deep, well demarcated, punctate, extending to level of eyes. *Cervical grooves* short, with deep pits. *Eyes* large, flat, level with scutal surface. Scutal punctations few, large, scattered.

Venter (Fig. 2) without ventral plaques; genital aperture between coxae II; setae minute, randomly scattered.

Capitulum (Figs. 3, 4): Length from palpal apices to cornua apices 1.75-2.35 (2.02), width 0.95-1.30 (1.11); *basis capituli* dorsally subrectangular; all specimens examined lack ornamentation, posterior margin straight between subtriangular cornua. Ventrally with posterior margin broadly rounded; a few minute, white setae at each posterolateral angle. *Palpi* length 1.33-1.80 (1.50), width 0.43-0.55

(0.50); average lengths of segments I-III, 0.22, 0.87, 0.42, respectively. Palpal segment II with a small knob-like posteroexternal ridge. *Hypostome* (Figs. 4, 5) about as long as palpi; length of toothed portion (excluding posterior crenulations) 0.58-0.83 (0.67); dental formula 3.5/3.5. Usual number of teeth per file as follows: I-8, II-7, III-7, III.5—variable, from 3-9, often 5-7; apex with numerous fine denticles.

Legs (Fig. 6) long, femur and tibia with pale ring at segment's distal end. Coxae I with two moderately long broad spurs, the external slightly longer; II and III each with a short bluntly rounded spur; IV with a moderately long, slightly curved spur. Trochanters lack spurs. Tarsus I length 1.25-1.50 (1.36), width 0.40-0.50 (0.44), tarsus IV length 0.75-1.03 (0.95), width 0.30-0.45 (0.37).

Female (Figs. 7-12).—Dorsum convex as in ♂. Length (unfed, exclusive of capitulum 5.75-7.23 (6.53), width 4.88-5.75 (5.33). *Scutum* length 2.88-3.38 (3.17), width 3.58-4.13 (3.92), outline as illustrated; scapulae bluntly rounded. Ornamentation variable in distribution but essentially as illustrated; cervical stripe narrow, fused with limiting spot; marginal scutal coloration dark brown. *Eyes* and *cervical grooves* as in ♂. A few deep punctation in cervical areas and scattered over scutum; punctations shallower and more numerous in anterolateral areas. Dorsum of body leathery; *marginal groove* complete, deep; festoons II, well delineated.

Venter (Fig. 8): Details of integument, genital area, and spiracular plate as illustrated. Genital aperture (Fig. 11) broadly U-shaped with lateral rim thickened, smooth.

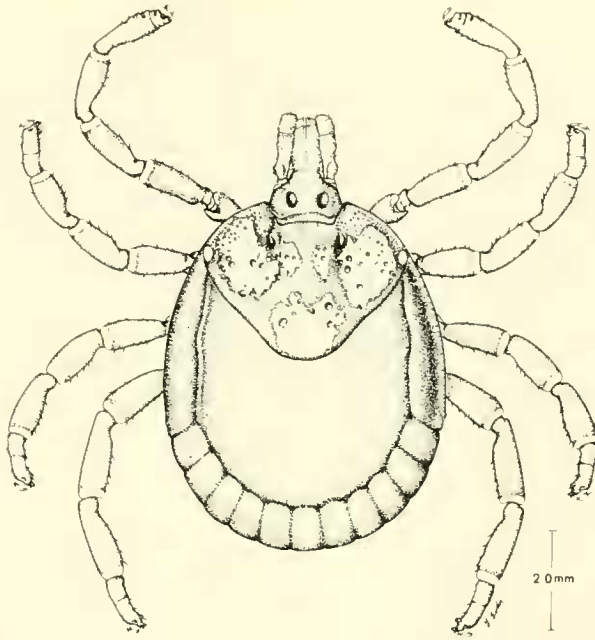
Capitulum (Figs. 9, 10) length from palpal apices to cornua apices 2.13-2.43 (2.28), width 1.25-1.40 (1.32); porose areas moderately large, diameter of one area 0.19-0.30 (0.25); interporose area 0.16-0.25 (0.24); setae absent; posterior margin straight between moderately large, rounded cornua; external margin of basis broadly convex. Ventrally as figured (Fig. 10) with several minute setae at each posterolateral angle. *Palpi* length 1.55-1.93 (1.74), width 0.50-0.60 (0.54); average lengths of segments I-III, 0.21, 1.03, 0.50 respectively; configuration of palpal segment II similar to that of ♂. *Hypostome* (Fig. 10) length of toothed portion 0.69-0.75 (0.72) (9 measured); dental formula 3.5/3.5 or 4/4, denticles in files of 7-10 with crenulations continuing posteriorly toward base; apex indented with a large corona of fine denticles.

Legs (Fig. 12) long, each free segment with a pale annular ring at the distal extremity. Coxae I with a broad, flat, triangular internal spur and a longer, narrower, bluntly rounded external spur; coxae II, III each with a single plate-like spur about as wide as long; coxae IV with a rounded, slightly elongate spur. Trochanters lack spurs. Tarsus I length 1.43-1.73 (1.59), width 0.43-0.48 (0.45); tarsus IV length 1.00-1.25 (1.13), width 0.33-0.45 (0.38).

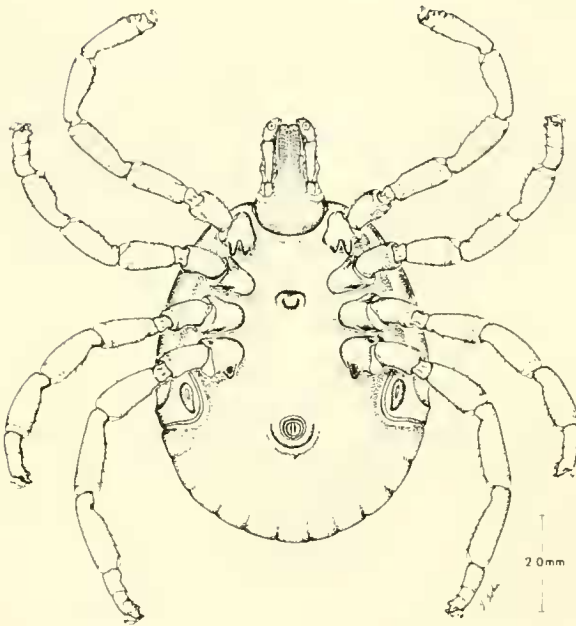
MATERIAL EXAMINED

Two hundred and five specimens of *A. paulopunctatum* were examined during this study: 122 ♂, 66 ♀, 14 N, 3 L. Although not derived from a reared series, the immature stages are tentatively considered to be *A. paulopunctatum* based upon the descriptions and figures of Elbl (1977).

GUINEA 1 ♂ (holotype), (RML 117338), Conakry (09°31'N, 13°43'W), no host or date, Maclaud. SIERRA LEONE, 1 ♂ (RML 66663), Freetown (08°30'N,



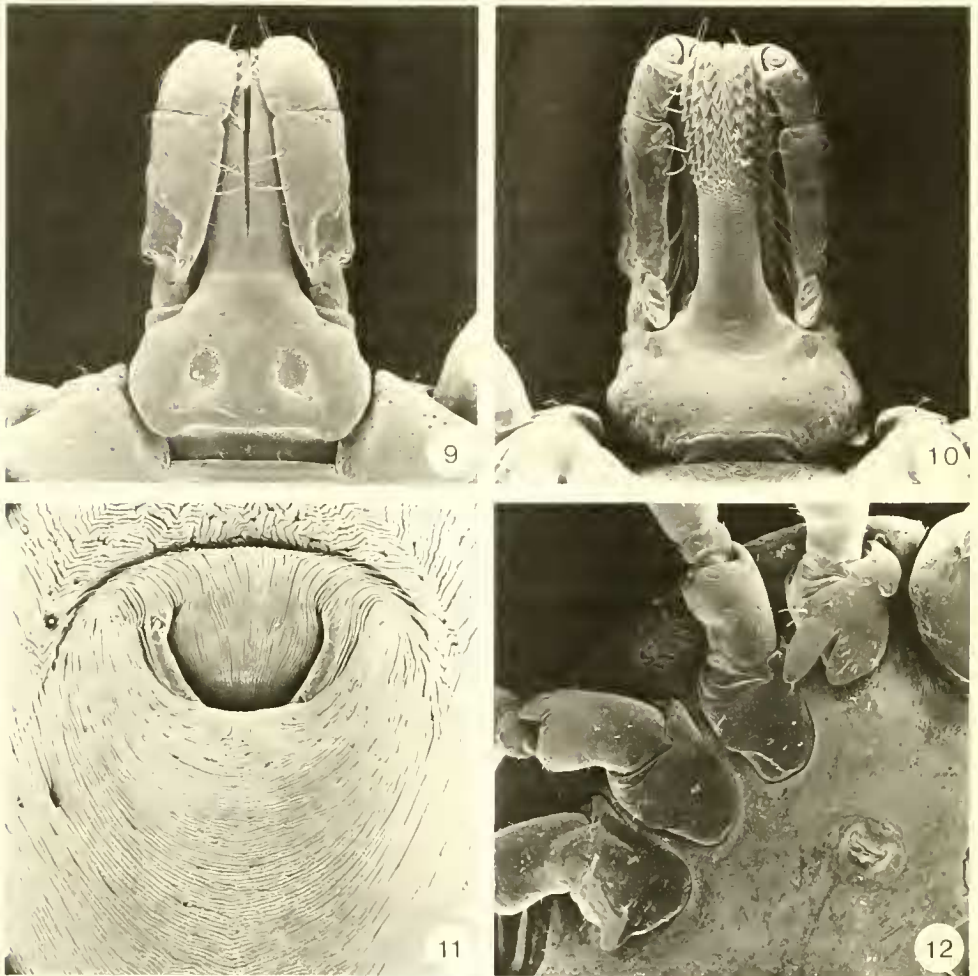
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Figs. 7, 8. *Amblyomma paulopunctatum* ♀ ZAIRE (RML 116826). 7, Dorsal view. 8, Ventral view.

13°15'W), fell from grass onto collector's shoe, IX.1949, Dr. W. Peters; 1 ♂ (RML 116963), no specific locality, host, or date. [This ♂ had at one time been pinned. A small label with a pin hole in it has the words "From W. F. H. Rosenberg".] CAMEROUN, 1 ♂ (RML 117035), Yaoundé (03°52'N, 11°13'E), "sur Porc" (pre-



Figs. 9–12. *Amblyomma paulopunctatum* ♀ ZAIRE (RML 116826). 9, Capitulum, dorsal view (38×). 10, Capitulum, ventral view (38×). 11, Genital aperture (125×). 12, Coxae I–IV (38×).

sumably *Sus scrofa*), 4.VI.1951, J. P. Qolam (?). ANGOLA, 3 ♀ (RML 111286), (Nuttall 2478), São Salvador do Congo (06°16'S, 14°15'E), *Varanus* sp., IX.1913, received from Dr. Mercier Gamble; 1 ♂, 1 ♀ (RML 117055), Canzele (08°17'S, 15°11'E), *Potamochoerus porcus koiropotamus*, 17.II.1955, Gerd Heinrich; 3 ♂, 1 ♀ (RML 117056), Lua Passo (locality not verified), *Sus scrofa*, IX.1955, Dr. Victor Matos. CENTRAL AFRICAN REPUBLIC, 2 ♂ (RML 116936), Carnot (04°48'N, 16°03'E or 04°56'N, 15°52'E), Oubangui-Chari, *Potamochoerus porcus*, II.1952, R. Rousselot; 4 ♂, 1 ♀ (RML 116984), no specific locality, *Potamochoerus porus*, 29.V.1971, P. C. Morel; 5 ♂, 2 ♀ (RML 117339) (HH 112055), Boku River (05°16'N, 26°10'E), near Obo, Haut-Mbombou, *Phacochoerus aethiopicus* (3 yrs. old), XII.1979, B. J. Linquist (from F. Mwakima). UGANDA, 1 ♀ (RML 111971) (Nuttall 3091), Daro Forest, Toro District (00°30'N, 30°30'E), off grass, X.1911, S. A. Neave; 7 ♂, 3 ♀ (RML 116937), Masindi (01°03'N, 31°43'E), *Hylochoerus meinertzhageni*, 5.VII.1952, Fazal Haq; 1 ♀ (RML 117335) (HH 39175), Queen

Elizabeth National Park (00°15'S, 30°00'E), near Kayanja, Hyaena sp. (central den) I.1967, A. J. Sutcliffe; 3 ♂, 2 ♀ (RML 117336), no specific locality, *Potamochoerus porcus*, II.1911, Capt. A. D. Fraser. BURUNDI, 3 ♂, 3 ♀ (RML 117045), Rumonge (03°59'S, 29°26'E), *Phacochoerus aethiopicus*, 5.IV.1949, F. Y. Francois. ZAIRE, 2 N (RML 117038), Bagata (03°44'S, 17°57'E), *Potamochoerus porcus*, VIII.1945, A. Fain; 4 N (RML 117049, all data as above; 2 N (RML 117043), Bolo (03°40'S, 17°20'E), *Potamochoerus porcus*, no date, A. Fain; 2 N (RML 117042), Balibi (03°58'S, 18°28'E) [Elbl (1977) cited the locality as Bolobo], *Potamochoerus porcus*, V.1945, A. Fain; 4 ♂, 1 ♀ (RML 117052), Luiza (07°12'S, 22°25'E), *Potamochoerus porcus nyassae*, VIII.1956, M. Poll; 1 ♂ (RML 117041), Doruma (04°44'N, 27°42'E), host unknown, 16.XII.1928, Henrard; 2 ♂ (RML 117040), locality as above, *Phacochoerus aethiopicus*, no date, H. Schouteden; 11 ♂, 8 ♀ (RML 117044), Gwane (04°43'N, 25°50'E), Uele District, *Phacochoerus aethiopicus* [cited as *Potamochoerus* in Elbl and Anastos (1966)], 1931, Bentz; 1 ♀ (RML 117036), Arebi (02°45'N, 29°37'E), *Potamochoerus porcus*, 20.VII.1925, H. Schouteden; 2 ♂, 4 ♀ (RML 116964), Avakubi (01°20'N, 27°34'E), *Potamochoerus porcus*, no date or collector; 2 N (RML 117054), Beno (03°37'S, 17°48'E), *Potamochoerus porcus*, III.1945, A. Fain; 1 ♂, 2 ♀ (RML 117047), probably Bosolindo (04°14'N, 19°55'E), *Potamochoerus porcus*, 29.VI.1929, Y. Berteaux; 8 ♂, 2 ♀ (RML 117050), Valalonka (locality not verified), Kwango District, *Potamochoerus porcus*, 1945, A. Fain; 1 ♀ (RML 117039), Bolobo (02°10'S, 16°14'E), *Potamochoerus porcus*, IV.1921, H. Schouteden; 1 ♂ (RML 117051), all data as above; 3 ♂, 1 ♀ (RML 117037), Haut-Lopori (00°35'N, 22°53'E), *Potamochoerus porcus*, X.1927, I. Ghesquière; 2 ♀ (RML 116962), locality and host as above, no date or collector; 1 ♂ (RML 117046), Penge (04°27'S, 28°26'E), host unknown, VII.1932, Putnam; 1 N (RML 117053), Tshuapa, Ikela (locality not verified), *Afropavo congolensis*, 1956, R. P. Lootens; 1 N, 3 L (RML 117048), Simba (00°36'N, 22°55'E), *Afropavo congolensis*, no date, L. G. Benoit.

The following 7 collections were all originally part of a single collection made during the American Museum of Natural History Congo Expedition [see Dickerson (1910), Lang (1915)]. Over the years the collection has been split up and specimens deposited in several museums.

ZAIRE, Medje (02°25'N, 27°18'E), *Hylochoerus meinertzhageni*, VI.1914, H. Lang & J. P. Chapin: 40 ♂, 8 ♀ (RML 18562) in the AMNH collection; 6 ♂, 6 ♀ (RML 18562), 5 ♂, 5 ♀ (RML 116826), 1 ♂ (RML 46458) all in the USNM collection; 1 ♂, 3 ♀ (RML 116961) in the MCZ collection; 2 ♂, 2 ♀ (RML 117085) in the Ohio State University collection, formerly in the University of Maryland collection; 5 ♂, 4 ♀ (RML 112370) (Nuttall 3437) in the Nuttall collection, British Museum (Nat. Hist.), presented by S. Hadwen, VII.1922, and cited by Robinson (1926) as originating in West Africa although, in the Nuttall catalogue, the collecting locality is listed as Congo (Keirans, 1985). Bequaert (1930) also discussed this collection.

HOSTS AND DISTRIBUTION

As can be seen from the host records above, *A. paulopunctatum* has a strong affinity for members of the mammalian family Suidae. Of the 36 collections examined, 26 are from members of this family, 6 collections from grass or unknown hosts, 2 from birds (Phasianidae), and one each from a hyaena den and a

reptile, *Varanus* sp. The report of *A. paulopunctatum* on tortoise (Rageau, 1951) was actually of *A. nuttalli* (Rageau, 1953). Theiler and Salisbury (1959) saw a male *A. paulopunctatum* which had been collected on an elephant in Cameroun (Ziemann collection, Berlin) and Morel (1959) a male from a human, Yapou, Ivory Coast. Reports of *A. paulopunctatum* parasitizing man are very rare although there is a possibility that immatures of this species may attach to the nasal mucosa of humans (Walton, 1960).

Amblyomma paulopunctatum is found in forested areas with an average rainfall of over 1500 mm (Theiler, 1962) and is distributed roughly between 10°N and 10°S of the equator, from the Atlantic coast in the west to approximately 32°E in Uganda.

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